

## **SOP 2 - Chemical Hazard Classes**

The following chemical hazard classes relate to the storage of chemicals. The classes are not mutually exclusive, as it is possible to have chemicals that have combinations of these properties.

### **A. Corrosive Chemicals**

1. Can burn, irritate, or destructively attack organic tissue.
2. Certain strong acids (sulfuric and nitric, for example) attack metals and evolve hydrogen, which is flammable and explosive.
3. At elevated temperatures, corrosives generally release toxic or irritating fumes.

### **B. General Precautions:**

1. Avoid contact with skin and eyes.
2. Avoid breathing vapors.
3. Wear adequate protective equipment as specified in the chemical's Material Safety Data Sheet.
4. Use corrosive chemicals only in areas with adequate ventilation.
  - a. Examples: acids, acid halides, caustics, bromine.

### **C. Flammable Chemicals**

#### **Definitions**

- A. Slightly Combustible - has flash point between 200 and 1501 degrees Fahrenheit.
- B. Moderately Combustible - has flash point between 100 and 200 degrees Fahrenheit.
- C. Highly Flammable - has flash point between 73 and 100 degrees Fahrenheit or has flash point below 73 degrees Fahrenheit with boiling point above 100 degrees Fahrenheit.
- D. Extremely Flammable - has flash point below 73 degrees Fahrenheit and a boiling point below 100 degrees Fahrenheit.
  1. General Precautions:
    - a. Store flammable chemicals away from oxidizers.

- b. Store flammable chemicals only in the chemical storage room, or in approved flammable storage cabinets.
- c. Wood, cloth, paper, or other such combustible materials shall not be stored in same cabinet with flammable chemicals.
- d. Use flammable chemicals only in areas where there are no open flames, cigarettes, electric arcs, or other sources of ignition.
- e. Flammable liquid safety can covers shall not be held open by any other device than a fusible link mechanism.
- f. Open flames shall not be used to heat a flammable liquid or to carry out distillation under reduced pressure.
- g. Use non-sparking electrical equipment when volatile flammable materials may be present.
- h. Wear appropriate personal protective equipment as specified in the chemical's material safety data sheet.
- i. Examples: hexane, ether, acetone, alcohols, hydrocarbons.

E. Oxidizers - An oxidizer is any solid or liquid that readily yields oxygen or other oxidizing gas or that readily reacts to oxidize combustible materials.

1. General Precautions

- a. Insure adequate quantities of emergency water are available, as oxidizers can attack human tissue.
- b. Store and use oxidizers to avoid contact with incompatible materials such as ordinary combustibles, flammable liquids, greases, and other reactive oxidizers.
- c. Segregate water-compatible oxidizers from water-incompatible oxidizers, and also solid and liquid oxidizers within these groups due to potential reactivity.
- d. Wear appropriate personal protective equipment as specified in the chemical's Material Safety Data Sheet.
- e. Store oxidizers in glass or other inert containers (preferably unbreakable); corks and rubber stoppers should not be used.
- f. Heat with fiberglass mantles or sand baths (instead of oil baths) reaction vessels containing significant quantities of oxidizers.

## 2. Examples

- a. Oxidizers that increase the burning rate of combustible materials: magnesium perchlorate, silver nitrate, hydrogen peroxide solutions between 8 and 27.5% by weight.
- b. Oxidizers that may moderately increase the burning rate or that may cause spontaneous combustion of combustible materials: chromic acid, sodium peroxide, hydrogen peroxide solutions between 27.5 and 52% by weight.
- c. Oxidizers that severely increase the burning rate of combustible materials or that will undergo vigorous self-sustained decomposition when catalyzed or exposed to heat: ammonium dichromate, sodium chlorate, hydrogen peroxide solutions between 52 and 91% by weight.
- d. Oxidizers that can undergo an explosive reaction when catalyzed or exposed to heat, shock, or friction: ammonium perchlorate, potassium superoxide, ammonium permanganate, hydrogen peroxide solutions more than 91% by weight.

F. Toxics - A toxic chemical has the ability to damage or interfere with the metabolism of living tissue.

### 1. General Precautions

- a. Work with at least one other person in the room if the chemical is highly toxic.
- b. Wear appropriate personal protective equipment as described in the chemical's Material Safety Data Sheet.
- c. Conduct operations under a hood if such operations may generate aerosols or fumes.
- d. Wash hands and arms immediately after working with toxic chemicals.
- e. Never eat, drink, smoke, chew gum, apply cosmetics, take medicine, or store food in areas where toxic chemicals are used.
- f. Take steps to prevent or protect against accidental spills (See SOP 18, Spills).
- g. Prepare for potential spills or other accidents by having appropriate first aid and emergency response equipment available.

2. Examples: Chloroform, formaldehyde, mercury, potassium chromate.